

Rehab Project Background

Project Name: American Fork-Dry Creek Watershed
Rehab of Silver Lake & Tibble Fork Dams
American Fork Canyon - Utah County
PL-566-Watershed #2006

Objective: Rehab structures to meet current dam safety engineering and performance criteria (hydrology, seismic, etc.).

Dam Numbers: Silver Lake Flat # UT00276
Tibble Fork # UT00299

Original Project Authority: PL-83-566 – Small Watersheds Program

Dam Location: American Fork Canyon, Utah County, Utah

Sponsoring Local Organizations: Lead = North Utah County Water Conservancy District

Sponsor Contacts:

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Year Dams Constructed: Silver Lake Flat - 1971
Tibble Fork - 1966



Description of existing condition and known rehabilitation needs of Silver Lake Flat: Silver Lake Flat dam was completed in 1971. The site was designed and constructed as a Class “c” (high) hazard site, meaning there was a high probability of loss-of-life if the dam should fail. The dam was planned and built for the primary purpose of storage of irrigation water and has incidental benefits of flood control and sediment retention. It was designed to have a 100-year economic life.

There is a seepage area in the left downstream groin of the dam. It is visible in normal to wetter precipitation years and not visible in dry years. This seep has been noted since the completion of the dam. No investigation has been performed to determine the relationship of the seep to the safety of the dam. Only clear water has been noted in the flows.

There has been a seep noted in the toe area of the right downstream area at the bend of the dam.

This seepage crosses the approach road and flows into a wetland area. The situation has not been investigated in detail. Only clear water has been noted in the flows.

There was a major seep and soil slough observed in 1997 in the left abutment about 150 feet east and away from the dam. It did not appear to affect the dam or the groin seep. This most recent seep and the groin seep indicate the presence of a ground water system in the left abutment area that could be affecting the dam over time.

Sloughing has periodically blocked the bottom of the concrete chute and damaged the fence. Sloughing occurs from the right side of the chute and is related to natural water loading of the soils on the steep construction slope of the chute area. These occurrences have been addressed through ongoing maintenance as needed.

A series of sinkholes with vortices and pipeholes were noted in 1995 in the left area of the reservoir within about 200 feet of the dam. The reservoir was lowered and the sinkholes were investigated. Dye testing of the sinkholes was inconclusive. No seepage was noted in the left abutment area or the left groin area. It was determined that the topsoil and a pipeline trough had not been removed during construction and that a large mass of waste boulders to 4 feet in diameter was present in the area of the sinkholes. The boulders and topsoil were removed and the area was repacked to merge with the existing blanket.

The site has generally been well maintained and the sponsors have responded to operation and maintenance issues in a timely manner over the years.

Possible work items involved with rehabilitation of Silver Lake Flat Dam:

1. Modify the dam and auxiliary (emergency) spillway to meet the modern criteria required of a Class "c" (high) hazard dam. This may consist of raising the top of the dam, raising and/or widening the auxiliary (emergency) spillway, installing a concrete chute spillway, or a combination of these.
2. Extend the principal spillway pipe system if the dam is raised.
3. Replace some or all of the metal work in the water conveyance system.
4. Sediment removal → and/or increase storage capacity of the reservoir.
5. Test for mining contaminants in reservoir sediment and embankment materials
6. Evaluate seepage issues in detail to determine if any long-term hazard and/or solution.
7. Evaluate access for heavy equipment ingress/egress up access road to Silver Lake Flat. Consideration of alternative access due to safety.

Description of the current benefits provided by Silver Lake Flat: The dam provides flood prevention or reduction benefits on the recreational, agricultural, residential, and business areas downstream. The watershed work plan estimated that the value of average annual irrigation benefits from construction of the Silver Lake Flat dam and other associated structures was estimated at an amount of \$57,850. This value equates to an annual benefit of \$322,315 in 2009. *Source from U.S. Bureau of Labor Statistics: http://www.bls.gov/data/inflation_calculator.htm).*

The American Fork – Dry Creek Watershed Project as a whole, including both structural and

land treatment measures, was projected to result in an 84% reduction in flood, sediment, and other damages within the project area. Significant development has occurred in the flood inundation area, drastically increasing the average annual value of flood-prevention benefits that accrue as a result of completion of the watershed project.

Dam Safety Agency information, permit needs, comments, and recommendations on rehabilitation needs for the specific dam. If the State Dam Safety Agency ordered any action on the dam, attach a copy of the order:

Link for the latest attached State Dam Safety inspection report – July 2009.
[Silver Lake Info\SilverLakeDam_Inspect_July2009.pdf](#)

Description of existing condition and known rehabilitation needs of Tibble Fork Dam:

Tibble Fork dam was designed prior to 1966 and construction on the site was completed in 1966. The site was designed and constructed as a Class “c” (high) hazard site, meaning there was a high probability of loss-of-life if the dam should fail. The dam was planned and built with flood control and sedimentation retention being the primary purposes of the structure. All other uses are for secondary purposes. It was designed to have a 100-year economic life and a 50 year sediment storage life.

Landslides occurred upstream of the reservoir during 1983 increasing the sediment load to the reservoir. One landslide movement blocked the inlet channel about one mile upstream of the pool area. This landslide has been cleared and the valley floor reshaped leaving a narrow stream channel with high embankments. The channel is armored.

Seepage has been observed downstream of the dam embankment in the past. Seepage continues to be observed at the downstream embankment area but is “clean”. This would indicate that the seepage is not related to the embankment but it is not definitive. See the latest State Dam Safety inspection report attached.

Description of the current benefits provided by Tibble Fork Dam:

The dam provides flood prevention or reduction benefits on the recreational, agricultural, residential, and business areas downstream. Landowners downstream of the dam benefit from the reduction of flooding occurrences, reduced periods of denied access to their property, and reduction in sedimentation of their property. The local and state highway departments and the general public benefit from the reduction of flooding occurrences and potential damage to road and bridge crossings downstream of the dam.

The watershed work plan estimated that the value of average annual damage reduction from construction of the Tibble Fork dam was estimated at an amount of \$17,825 (*approximately \$133,334 in 2009 value*). The American Fork – Dry Creek Watershed Project as a whole, including both structural and land treatment measures, was projected to result in an 84%

reduction in flood, sediment, and other damages within the project area. The estimated downstream benefits were numerated in approximate 1958 dollars based on the then-existing downstream infrastructure and population. Significant development has occurred in the flood inundation area, drastically increasing the average annual value of flood-prevention benefits that accrue as a result of completion of the watershed project. In order to accurately quantify these benefits in 2009 dollars, a detailed economic study would be necessary.

Possible work items involved with rehabilitation of Tibble Fork Dam:

1. Modify the dam and auxiliary (emergency) spillway to meet the modern criteria required of a Class “c” (high) hazard dam. This may consist of raising the top of the dam, raising and/or widening the auxiliary (emergency) spillway, installing a concrete chute spillway, or a combination of these.
2. Extend the principal spillway pipe system if the dam is raised.
3. Replace some or all of the metal work in the water conveyance system.
4. Sediment removal → and/or increase storage capacity of the reservoir.
5. Testing for contaminants in the reservoir sediments and embankment materials will be necessary due to the historic mining activity in the upper watershed. If present, evaluate alternatives for disposal.
6. Evaluate seepage issues in detail to determine if any long-term hazard and/or solution.
7. Evaluate closure of access across Tibble Fork Dam – replaced with alternative access to summer homes downstream of the dam.

Dam Safety Agency information, permit needs, comments, and recommendations on rehabilitation needs for the specific dam. If the State Dam Safety Agency ordered any action on the dam, attach a copy of the order:

Link for the latest attached Utah State Dam Safety inspection report – July 2009.

[Tibble Fork Info\TibbleFk_Inspect_July2009.pdf](#)